

BAHAMA POLYGALACEAE AND THEIR GREATER ANTILLEAN  
AFFINITIES -- A PRELIMINARY TREATMENT

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*Polygala* is one of the great taxonomic and nomenclatural horrors among West Indian plants. It not only is reported to have apomictic forms (Long and Lakela, 1971), and possibly has species which hybridize, but also demonstrates great variation in vegetative morphology. It is this latter trait which has led splitters among workers in the past to overdescribe taxa in West Indian members of the genus.

In an effort to unravel taxonomic and nomenclatural problems in *Polygala* for the Bahama flora which Mr. George R. Proctor and I are revising, I have made study among the *Polygala* species known from the Bahamas and adjacent regions, working largely with herbarium material. Most of the study has been carried out at the Field Museum of Natural History where I have examined the extensive and classic collections of N.L. Britton, C.F. Millspaugh, L.J.K. Brace, Percy Wilson, and J. and A. Northrop from the Bahamas. I should like to thank Dr. L.I. Nevling, Jr., Chairman of the Botany Department at the Field Museum together with other administration and staff personnel, for making these collections available to me. Furthermore, I acknowledge with appreciation curators and directors of the Gray Herbarium and Arnold Arboretum of Harvard University, the United States National Herbarium and the New York Botanical Garden Herbarium for the loan of specimens. Especially important have been specimens including types seen by S.F. Blake, who monographed U.S. and West Indian *Polygala* (1916) and who revised *Polygala* for the *North American Flora* (1924). I should also like to acknowledge with appreciation travel funds granted by Hope College for visits to herbaria in undertaking this study. Thanks are due Drs. John H. Beaman, Norton G. Miller, and Paul Van Faasen for their critical review of the manuscript and for helpful suggestions for its improvement.

J.K. Small contributed the treatment of *Polygala* in Britton and Millspaugh's Bahama flora (1920). One might infer that he also influenced their use of the segregate genus *Badiera* for the one woody member of the alliance treated earlier by Blake (1916) as *Polygala oblongata*. Britton (1907, 1910) also revised the genus *Badiera*. As was common during that period of taxonomic history, no infraspecific categories were recognized; when a morphological segregate was found in an archipelago like the Bahamas, it was likely to be described as a new species, rather than being considered to be a form of a more wide-ranging species.

Small's treatment of *Polygala* for the Bahama flora (1920) consisted of six species (including *Badiera*). Herein, five of these are treated under different names from those in Bahama flora (ibid.) including one new combination. Other new combinations are made herein for related taxa occurring on islands in the Greater Antilles.

KEY TO *POLYGALA* IN THE BAHAMAS

- A. Plants shrubby; calyx lobes unequal but all free; keel without a beak.....1.(Subg. *Badiera*) *Polygala penaea* (see key to subspecies below).
- A. Plants herbaceous; calyx lobes uniform; keel with or without a beak or crest.....B.
  - B. Leaves alternate; keel without a beak or crest; abaxial sepals connate.....2.(Subg. *Habeclada*)  
*Polygala grandiflora* var. *angustifolia*.
  - B. Leaves verticillate; keel with a 2-many-lobed crest; abaxial sepals free.....(Subg. *Polygala*)...C.
    - C. Leaves in whorls of 4, 2-6 mm wide, 3.5-7.5 mm long...D.
    - C. Leaves in whorls of 2-3, 1.5-2.5 mm wide, 8 - 17 mm long.....4.*Polygala spathulata*.
      - D. Capsule about as broad as long; lowermost leaves elliptic-obovate, often mucronate; upper blades linear;  $2n = 28$ ...3a.*Polygala boykini* var. *boykini*.
      - D. Capsule manifestly longer than broad; lowermost leaves subulate to linear or linear-lanceolate; upper blades few;  $2n = 96$ .....3b.  
*Polygala boykini* var. *sparsifolia*.

*Polygala penaea* L. Sp. Pl. 2: 703. 1753.

KEY TO SUBSPECIES OF *POLYGALA PENAEA*

- A. Leaves scabrous, papillose above and below, fruit hispidulous or pilosulous.....1a.*Polygala penaea* L. subsp. *penaea*.
- A. Leaves glabrous to glabrate, not rough to the touch; fruit glabrous to appressed-strigillose or pubescent chiefly on the margin.....B.

- B. Leaves less than 5 mm broad.....ld. *Polygala penaea*  
subsp. *guantanamana*.
- B. Leaves more than 7 mm broad.....C.
- C. Leaves lustrous on upper surface, revolute.....  
..lc. *Polygala penaea* subsp. *portoricensis*.
- C. Leaves glabrous or glabrate on upper surface, not  
lustrous; leaves plane.....lb. *Polygala*  
*penaea* subsp. *oblongata*.

1a. *Polygala penaea* L. subsp. *penaea*

*P. penaea* L. Sp. Pl. 2: 703. 1753. *Badiera penaea* (L.)  
DC., Prodr. 1: 335. 1824. Type: Habitat in America  
America meridionali. Lectotype: LINN (not seen).

*Polygala domingensis* Jacq., Sel. Stirp. Pict. 96. 1780.  
*Badiera domingensis* (Jacq.) DC., Prodr. 1: 335. 1824.  
Type: unknown.

This is the form found in Hispaniola, both in Haiti and in  
the Dominican Republic. It differs from other subspecies  
by its scabrous, broad leaves.

1b. *Polygala penaea* subsp. *oblongata* (Britton) Gillis, comb. et  
stat. nov.

Basionym: *Badiera oblongata* Britton, Bull. N.Y. Bot. Gard. 5:  
314. 1907. *Polygala oblongata* (Britton) Blake, Contr.  
Gray Herb. 47: 13. 1916. Type: Britton & Brace 578,  
Bahama Islands, New Providence Island, north slope of  
Blue Hills. Holotype: NY; Isotypes: F-185945; US-655924,  
US-758265.

*Polygala dimorphophyllum* Blake, Contr. Gray Herb. 47: 16.  
1916. *Badiera heterophylla* Britton, Bull. Torrey Bot.  
Club 42: 496. 1915, non *Polygala heterophylla* Scheele,  
Linnaea 17: 336. 1843. Type: Cuba, Oriente Province,  
deciduous woods, Sierra Nipe near Woodfred. 450-550 m.  
elevation. Shafer 3070. Holotype: NY; Isotype: US-792308.

*Polygala punctifera* Blake, Contr. Gray Herb. 47: 13. 1916.  
*Badiera punctata* Britton, Bull. Torrey Bot. Club 42: 496.  
1915, non *Polygala punctata* A.W. Benn., J. Bot. 17: 172.  
1879. Type: Cuba, Oriente Province, near streams, Arroyo  
del Medio above the falls. Shafer 3644. Holotype: NY;  
Isotype: US-792655.

*Polygala diversifolia* f. *elliptica* Chodat, Monogr. 2: 10.  
1893. Type: Wright 1914, pro parte.

*Polygala diversifolia* f. *obovata* Chodat. Monogr. 2: 11. 1893. Type: *Wright 1914*, pro parte.

The present treatment recognizes the Cuban and Bahaman populations of this woody *Polygala* to be geographic subspecies of the inclusive and widespread Greater Antillean *P. penaea*. The only major difference from typical *P. penaea* is the lack of pubescence on the leaves and fruits in subsp. *oblongata*. It seems logical that geographic isolates in Cuba and the Bahamas should differ somewhat from the populations on Hispaniola. The Bahama populations probably originated from the Cuban ones, introduced through Andros Island or onto the Great Bahama Bank during the Pleistocene at a time when sea levels were 180 meters lower than at present and all of the Great Bahama Bank was exposed. The channel separating the Bahamas and Cuba (now about 190 km.) at that time was probably about 40 km. wide, thus increasing the likelihood of occasional dispersal of seeds from Cuba to the Great Bahama Bank. Once established on the Bank, the plant dispersed throughout the islands. As a geographic variant, this taxon is treated as a subspecies of *P. penaea*, the oldest name.

- 1c. *Polygala penaea* subsp. *portoricensis* (Britton) Gillis, comb. et stat. nov.

Basionym: *Badiera portoricensis* Britton, Bull. Torrey Bot. Club 42: 494. 1915. *Polygala portoricensis* (Britton) Blake, Contr. Gray Herb. 47: 14. 1916. Type: Puerto Rico, Guanajibo, near Mayaguez. Britton, Cowell & Brown 4349. Holotype: NY; Isotype: US-791496.

This Puerto Rican subspecies differs from the typical stock on Hispaniola in having a lustrous upper leaf surface, revolute leaves, and glabrous fruits. Flowers and fruits are indistinguishable from Cuban and Bahaman forms. Because there are so few differences between this form and typical *Polygala penaea*, it seems appropriate to reduce this taxon to a subspecies of *P. penaea*.

- 1d. *Polygala penaea* subsp. *guantanamana* (Blake) Gillis, comb. et stat. nov.

Basionym: *Polygala guantanamana* Blake, Contr. Gray Herb. 47: 12. 1916. *Badiera virgata* Britton, Bull. Torrey Bot. Club 37: 361, 1910, non *Polygala virgata* Thunb., Fl. Cap. (Africa). Type: Cuba, U.S. Naval Station, Guantanamo Bay. Britton 2086. Holotype: NY; Isotype: US-658842.

This segregate from southeastern Cuba differs only in having narrower leaves than those of the other subspecies, but otherwise, it has similar flowers and fruits.

2. *Polygala grandiflora* Walt. var. *grandiflora*.

Basionym: *Polygala grandiflora* Walt., Fl. Car. 179. 1788.

The type of Walter's *Polygala grandiflora* should be at the British Museum (Natural History). It has not been seen. Because populations in the Bahamas represent -- in my opinion -- a different variety, attention will be given to synonymy only for the variety in our flora.

*Polygala grandiflora* var. *angustifolia* T. & G., Fl. N. Amer. 1: 671. 1840 non *P. angustifolia* H.B.K. (= *P. brizoides* St. Hil.), non Gililo, Fl. Lituan. Type: Dr. Leavenworth, s.n. Lectotype: NY.

*Polygala cubensis* Chodat, Monogr. Polygal. 2: 62, t. 15, f. 36. 1893. Type: Cuba, Wright 112. Holotype: Not seen. Isotypes: BM, GH.

*Polygala wrightii* Chodat, Monogr. Polygal. 2: 67, t. 13, f. 8-9. 1893. Type: Cuba, Wright 112. Holotype: Not seen. Isotypes: K, BM, GH.

*Polygala krugii* Chodat, Monogr. Polygal. 2: 63, t. 15, f. 37-38. 1893. Type: New Providence, Bahamas. Eggers 4450. Holotype: Hb. Krug & Urb. at B (destroyed). Isotype: (fragment) NY.

*Polygala bahamensis* Blake, Contr. Gray Herb. 47: 64. 1916. Type: Bahamas, New Providence, pine region, 13.5 km. (8.5 mi.) S.W. of Nassau, 12 April 1905. A.E. Wight 272. Holotype: GH; Isotypes: NY, US-225463.

*Polygala cumulicola* Small, Bull. Torrey Bot. Club 51: 381. 1924. *Asemeia cumulicola* (Small) Small, Man. S.E. Fl., p. 766. 1933. Type: Florida, dunes opposite Miami (now = Miami Beach), J.K. Small & G.K. Small 4568. Holotype: NY; Isotypes: NY, US-1841792.

*Polygala miamiensis* Small ex Blake, N. Amer. Fl. 25: 340. 1924. *Asemeia miamiensis* (Small ex Blake) Small, Man. S.E. Fl., p. 767. 1933. Type: Florida, Everglades west of Miami, J.K. Small & G.K. Small 289. 9 November 1901. Holotype: NY.

*Polygala corallicola* Small, Bull. N.Y. Bot. Gard. 3: 425. 1905. Type: Florida, Dade Co., Miami. *Small & Nash, s.n.* Lectotype: NY.

*Polygala flabellata* Shuttleworth ex Gray, Pl. Wright. 1: 41. 1852, pro syn.

*Polygala grandiflora* var. *leptophylla* Chodat, Monogr. Polygal. 2: 57. 1893, non *Polygala leptophylla* Burch, 1822. Syntypes: Cuba, *Wright 112*. Hologsyntype: Not seen; Isosyntype: GH. Dominican Republic, Sierra de Palo, Quemado, 500 m. Hologsyntype: Not seen; Isosyntypes: BM, K (Not seen).

*Polygala grandiflora* var. *orbicularis* Chodat, Monogr. Polygal. 2: 57. 1893. Type: Dominican Republic, near Santiago on Cuesta de Piedra among grasses in calcareous soil; savanna near S. Carlon. *Preneloup 1004*. Holotype: Not seen.

*Polygala grandiflora leiodes* Blake, N. Amer. Fl. Polygalaceae 25: 339. 1926. *Asemeia leiodes* (Blake) Small, Man. S.E. Fl., p. 766. 1933. Type: Florida, Lee Co., Ft. Myers vicinity, in pineland. *Miss J.P. Standley 25*. Holotype: US-569482; Isotype: NY.

The whole complex of *Polygala grandiflora* needs thorough bio-systematic study. Typification of *P. grandiflora* Walt. needs to be carried out in order to determine whether, indeed, varieties such as those recognized herein differ from the type of the species. Further comprehensive study of variation throughout the range of the species is also needed. In a recent treatment of Polygalaceae of southeastern United States, Saulmon (1971), has treated the entire species complex as without infraspecific taxa. Varieties have been maintained at this juncture, but without substantial reason, to avoid conflict with nearby floras and other treatments (Long and Lakela, 1971; León and Alain, 1953; Miller, 1971).

*Polygala grandiflora* is variable, especially in vegetative characters. As treated herein, var. *grandiflora* has leaves greater than 0.8 cm wide (at the broadest point) and var. *angustifolia* has leaves narrower than this. It is likely that there is a range of variation in the wild within one taxon which spans this gulf.

The type of *P. grandiflora* var. *angustifolia* at the New York Botanical Garden consists of four above-ground portions of plants and a 3-inch piece of lower stem and root. A handwritten label is glued over two of the former, indicating

that it is a Chapman collection from Florida. Below the two remaining specimens are the words (in a different handwriting): "Florida. Dr. Leavenworth." All specimens appear to be identical. Across the Chapman label, in Torrey's handwriting, are the words "angustifolia T. & G. Suppl. Vol. I." Someone else has later added in pencil "Evidently the two type collections of..." with an arrow pointing to the epithet. I believe that all specimens on the sheet constitute material examined by Torrey. In his publication, he gives the following citation: "Southern Florida, Dr. Leavenworth! Middle Florida, Dr. Chapman." Because of the association of the exclamation point (!) with the Leavenworth specimen, I believe it should be considered the lectotype.

The collections of Wright from Cuba (no. 112) "prope villam Monte Verde dictam, Cuba orientali" have served as types of three different Chodat taxa: *Polygala wrightii*, *P. cubensis*, and *P. grandiflora* var. *leptophylla*. Specimens available to Chodat have not been examined, but duplicates at the Gray Herbarium were studied. One (herein labeled "A") has a date of Jan.-Jul. 1859. A second (herein labeled "B") is marked "1856-7 in Cuba orientali." The third (herein labeled "C") is marked "1860-1864." "A" and "B" are indistinguishable to me. Blake annotated them both as *P. angustifolia* H.B.K. but they are also isotypes of both *P. cubensis* and *P. wrightii*. Blake labeled "C" as "cotype collection, *P. grandiflora* Walt. var. *leptophylla* Chod." It is odd that Blake should label this specimen as such when he cited it in his monograph (1916) as the type of *P. cubensis*. Chodat chose parts of Wright 112 as types for both taxa, so Blake is not totally wrong. He did, however, cite this differently from the way he annotated it! In addition to the two names mentioned above, Chodat also cited Wright 112 p.p. as *P. angustifolia* H.B.K. I have called "C" as isotype of *P. cubensis*.

That certain of these other names listed above are synonymous is not a new treatment. Blake himself (1924) recognized the synonymy of *P. krugii* and *P. bahamensis*. Long (1970) has noted that *P. coralliocola* is the same as *P. grandiflora* var. *angustifolia*, etc.

The synonymy given here is to be considered only a beginning; it is far from exhaustive. My purpose has been to deal with names in Britton and Millspaugh's Bahama Flora (1920) and to try to equate them to names in use elsewhere in the northern West Indies and South Florida in order to bring more harmony to all these floras. Many more names abound. Unhappily, many of these will some day be found to apply to this complex as well.

3. *Polygala boykinii* Nutt., J. Acad. Nat. Sci. Philadelphia 7: 86. 1834.
- 3a. *P. boykinii* Nut. var. *boykinii*. Type: *Boykin*, s.n. Georgia. Holotype: PH.

*Polygala bicolor* Hook., J. Bot. 1: 194. 1834. Lectotype: K.

*Polygala wilsonii* Small in Britt. & Millsp., Bahama Flora, p. 216. 1920. Type: Bahama Islands, Cay Sal Bank, Anguilla Cays, *Wilson 8030*. Holotype: NY; Isotypes: A, F-246435, NY.

The typical variety of *Polygala boykinii* is found in the Bahamas only on the Cay Sal Bank where it was collected by Percy Wilson in 1909. It was described as new in the Bahama flora, but I have interpreted this collection as quite typical *P. boykinii*, having compared it to the type of the species at the Philadelphia Academy of Natural Sciences.

Although it may be shown that the taxa in this complex have distinct geographical ranges, I have chosen to recognize them at varietal rank for the moment. Inasmuch as this is a preliminary treatment, I see no point in making mass transfers to subspecies when I have no evidence for their having a distinct geographical range. In his treatment of Polygalaceae in the southeastern United States, Saulmon (1971) has considered no infraspecific taxa within this species.

- 3b. *Polygala boykinii* var. *sparsifolia* Wheelock, Mem. Torrey Bot. Club 2: 121. 1890. *Polygala sparsifolia* (Wheelock) Small, Fl. S.E. U.S., p. 686. 1903. Type: *A.H. Curtiss 503*, Florida, Cudjoe Key. Holotype: NY; Isotypes: US-7893, NY.

*Polygala praetervisa* Chodat, Monogr. Polygal. 2: 140. 1893. Type: *A.H. Curtiss 503*. Florida, Cudjoe Key. Holotype: Not seen. Isotypes: NY (2), US-7893.

*Polygala flagellaris* Small, Bull. N.Y. Bot. Gard. 3: 427. 1905. Type: Florida, Dade Co., pinelands near the Homestead Road between Cutler and Camp Longview. *J.K. Small & J.J. Carter 1078*. Holotype: NY.

*Polygala wightiana* Blake, Contr. Gray Herb. 47: 88. 1916, non *P. wightiana* Wall. ex Wight & Arnott, Prodr. Fl. Pen. Ind. Or. 1: 36. 1834. Type: Bahama Islands, New Providence Island, Adelaide, border of marsh in loamy sand and honeycomb limestone, 21 km. (13 miles) southwest of Nassau. *A.E. Wight 79*. Holotype: GH; Isotypes: F-225262, NY.

This variety has a number of distinctive characters that separate it from the typical variety. The two differ in size and proportions of the capsule, the shape of the lower leaves, and density of upper leaves, and in chromosome number (Lewis and Davis, 1962).

The typical variety has leaves along the stem of the inflorescence. The lowermost leaf blades are elliptic to obovate, often mucronate at the tip and grade into linear leaves toward the apex. The capsule is nearly as broad as long. Lewis and Davis (1962) have found the chromosome number to be  $2n = 28$ .

Chodat (1893) and Wheelock (1891) chose duplicates of the same collection as types of the two names *Polygala praetervisa* and *P. boykinii* var. *sparsifolia*, respectively. Although Chodat's material has not been seen, it is likely that this is not a mixed collection, but rather that the two workers chose portions of the same gathering coincidentally, both recognizing it as different from previously-known taxa.

On the other hand, variety *sparsifolia* has few leaves below the inflorescence. All leaves are more or less linear or linear-lanceolate. The chromosome number is  $2n = 96$ , (Lewis and Davis, 1962), a likely polyploid with aneuploidy. It is possible that this form is apomictic.

In the Bahamas *P. boykinii* var. *sparsifolia* is distributed throughout the archipelago, probably having migrated there from South Florida where its congeners are.

4. *Polygala spathulata* Griseb. Cat. Pl. Cub. 13. 1866. Type: Cuba, San Juan de Buenavista, banks among tall grass in savannas. Wright 1910. Holotype: GOET (Not seen); Isotypes: BM, GH, K.

This species of the Greater Antilles and the Bahamas remains nomenclaturally unchanged from the Bahama Flora (1920). It is found on islands of the Great and Little Bahama Banks, probably having crossed from Cuba during low-water stages of the Pleistocene when Andros and Cuba were less than 40 km. apart. It is a small, tufted plant, often overlooked in the essentially woody flora of the Bahamas.

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